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ABSTRACT

An integrated overview of the processes involved in the establishment of a vocational program of study for the disadvantaged student is provided in this paper. Occupational analysis, the first step in the establishment of such a program, is discussed and divided into three steps: (1) major job tasks; (2) sub-tasks; and (3) specific job functions. Examples are provided of each phase of this breakdown and the role of the student evaluator is described. An example of a program of study is detailed, as is a teaching methodology that stresses the mastery learning approach and the individualization of instruction. Also described are several instructional support strategies that have been found to be successful with the disadvantaged: (1) the use of learning centers, especially for developing basic skills; (2) the use of audio visual materials; and (3) the establishment of contingency contracts between student and teacher. Two personal variables are discussed that have a direct effect on student achievement and career development, namely, locus of control (a measure of how much someone feels personally responsible for his or her success or failure) and field dependence (a test to indicate the way a person perceives and recalls information presented to him or her). And finally, some teaching suggestions are outlined. (RDN)

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OCCUPATIONAL ANALYSIS, CURRICULUM DEVELOPMENT AND INSTRUCTIONAL STRATEGIES FOR THE DISADVANTAGED

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Introduction

In the establishment of a vocational program of study for the disadvantaged student, the process must be focused on the needs of the student and not on the needs of the school, classroom, or teacher. This process, which will benefit all students, must begin with an occupational analysis that is used to set up a course or courses of study. In teaching a course based on an occupational analysis, the only instructional delivery approach to be used is one based on mastery learning.

Along with the mastery learning style of teaching, there are instructional support strategies which can be quite effective with disadvantaged students. In addition, research has demonstrated that two variables, locus of control and field dependence, should be taken into consideration in the teaching-learning process. As a result of the influence of these two variables on achievement, specific teaching methods should be used in the classroom.

My paper today will be an overview of the above process. While each component in the process deserves an in-depth study, I feel it is important to see how all of the parts fit together.

Occupational Analysis

The first step in setting up any vocational program is to conduct an analysis of the occupation to be taught. This analysis must identify the knowledge and skills needed by a student to obtain employment.

While the analysis focuses on the cognitive and psychomotor domains of learning, the teacher cannot ignore the affictive (attitude) domain. The development of appropriate attitudes is critical in all vocational programs, but more so for these students who have not been exposed to acceptable on-the-job behavior. If they are not taught what behavior is acceptable and are not exposed to what is appropriate in their home environment, we can only hope for them to mimic a teacher and this is not good enough. Research has consistently shown that the leading cause for failure on-the-job is poor work attitude.

In the analysis of an occupation I recommend three steps in the breakdown of a job. The first step is to list the major job tasks (MJT), the second step is to list the sub-tasks (ST) for each major task, and the third step is to break the sub-tasks into specific job functions (SJF). These tasks at all three levels are then used to set up the vocational program.

Major Job Tasks (MJT):

The first task breakdown is to identify the major job tasks in the occupation. In doing this a form is used to list the major tasks as follows:

Major Job Tasks

Occupation:_____Evaluator(s):_____

Task Number	Task

The occupation must be given at the top of the form, and then the major tasks are listed and given a number. A danger here is for the evaluator to be too detailed. An example is as follows:

Major Job Tasks

Occupation: Automotive Repair Evaluator(s)_____

Task Number	Task
1	Electrical System
2	Ignition System

A suggestion is for the evaluator(s) to make a rough draft of the MJT list and then in the final draft to list these tasks in a hierarchy related to difficulty. In the example, the electrical system must be understood before the ignition system can be totally comprehended; however, they are separate systems and should be separate on the MJT list.

Sub-Tasks (ST):

The ST list also uses a similar form for each of the major tasks. An example of such a form is as follows:

Sub-Task List

Occupation:_____ Evaluator(s):_____

Task: _____

MJT No.	ST No.	Sub-Tasks

Again the evaluators should make a rough draft list of the sub-tasks, and then the final list should be given in a hierarchy from the most elementary sub-task to the more complex sub-tasks. To continue our automotive example:

Sub-Task List

Occupation: Automotive Repair Evaluator(s) _____

Task: Electrical System

MJT No.	ST No.	Sub-Task
1	1	Car Battery
1	2	Electrical Wiring
1	3	Fuses

In an occupational analysis one evaluator may be able to do the work from beginning to end; however, a team effort is quite easy to organize. By using a team of evaluators, each person may concentrate on those sub-tasks in which they feel more specialized. As occupational training becomes more sophisticated, in order to keep up with technical advancements, team efforts will become more of a necessity.

Specific Job Functions (SJF):

The final step in the analysis is to take each of the sub-tasks and lay out the specific job functions required for each. The use of a hierarchy here is absolutely essential, and the functions must be extremely detailed. To continue the example:

Specific Job Functions

Occupation: Automotive Repair Evaluator(s): _____

Task: Electrical System

ST: Car Battery

MJT No.	ST No.	SJF No.	Job	Function
1	1	1	Check battery water (if not a sealed battery).	1. Remove each cap. 2. Look in battery and determine if each cell has water. a) If not, put water in each cell to prescribed level.
1	1	2	Check battery voltage.	1. Determine if battery is 6 or 12 volt. 2. Determine if battery is positive or negative ground. 3. Take the battery test indicator, place the ..... etc.

The detail of the functions in the SJF is extremely important for students from disadvantaged backgrounds. For example, some of these youth may not have been exposed to positive ground systems, or 6 volt batteries. Only through very specific functions can the resulting instructions not take any knowledge for granted.

The Program of Study

A program of study consists of all the courses and instruction required for the successful completion of a program, such as auto-mechanic. This, of course, includes the academic subjects.

An automotive curriculum is more specifically concerned with the courses needed for a student to be prepared to enter the world of work as an auto-mechanic. Such a program cannot cover all of the details and bizarre features of all of the automobiles on the market today, or the many unusual quirks that mechanics learn through years of experience. Rather, such a program must, first, be sure to provide the basic essential knowledge needed for entry-level employment. Second, a program must require practice, practice, practice!

The basic essential knowledge needed for a vocational automotive repair curriculum should be obtained from the occupational analysis. The forms described above should provide the necessary data for setting up the courses, units in each course, and the lesson plans for each unit.

The MJT should be used to identify those major tasks that should be taught in a course, or in separate units of a course. In the sample, one of the major tasks was the electrical system and one was the ignition system. From this breakdown, two possibilities exist. One possibility is to have two separate courses: one on the electrical system and one on the ignition system. The other possibility is to have two units in one course: one unit on the electrical system, followed by a second unit on the ignition system.

Whether a program of study would have two courses or two units of study related to the electrical system and the ignition system depends on the school. For example, whether the courses were to cover 8-week periods or an entire school year would dictate if they would be set up as two separate courses or as two units of one course. For the disadvantaged student the major

consideration must be that sufficient time is allowed to cover the material needed for entry level employment, and that sufficient time is allowed for them to practice, practice, practice.

The sub-tasks (ST) from the MJT list are then used to break down the courses or units of study. If a major task is identified for a course, then the sub-tasks would in turn identify the units of study for the course. If the major tasks are used for setting up units of study, then the sub-tasks would be used to break down the units of study into sub-units. By having the ST numbers in a hierarchy of difficulty, the ordering of the units of study is made extremely easy and insures a logical presentation of the material.

Finally, the information from the SJF forms is used for the lesson plans needed to present the actual instruction. Since the SJF forms are directly related per the numbering system to the sub-tasks, which in turn are directly coded to the major tasks, the lesson plans will be in line with the units and courses in the curriculum.

In addition, since the SJF is in a strict hierarchy that identifies all of the steps to be taken to perform a job, a disadvantaged student will be guaranteed that the instruction will be presented in a hierarchy with reasonable learning steps, as recommended in the beginning of this chapter.

Methodology

In teaching the material prescribed via the occupational analysis and curriculum development, the mastery learning approach is absolutely essential. Since the tasks and functions are ordered in a hierarchy, a student cannot really progress to a higher task until he/she has mastered the more elementary tasks.

In addition, the mastery approach requires that a teacher begin instruction at each student's ability level, not at where the curriculum starts. As a result, if the lessons developed by the above process are at the most elementary beginning level, then

a student will not be started in a course with material above his/her capabilities. At the same time, if a student has had exposure to the occupation and is knowledgeable about the elementary materials, that student should receive instruction at his/her ability level.

In order to have a student begin a course at the correct point in the curriculum, and to progress from one lesson to the next lesson, the teacher must: 1) assess each student at the beginning of the course to determine their knowledge and psychomotor skills, and 2) set up their shop/classroom for the individualization of instruction. After completing a task and function analysis for the course, the construction of a preassessment simply uses the functions as presented in the STF.

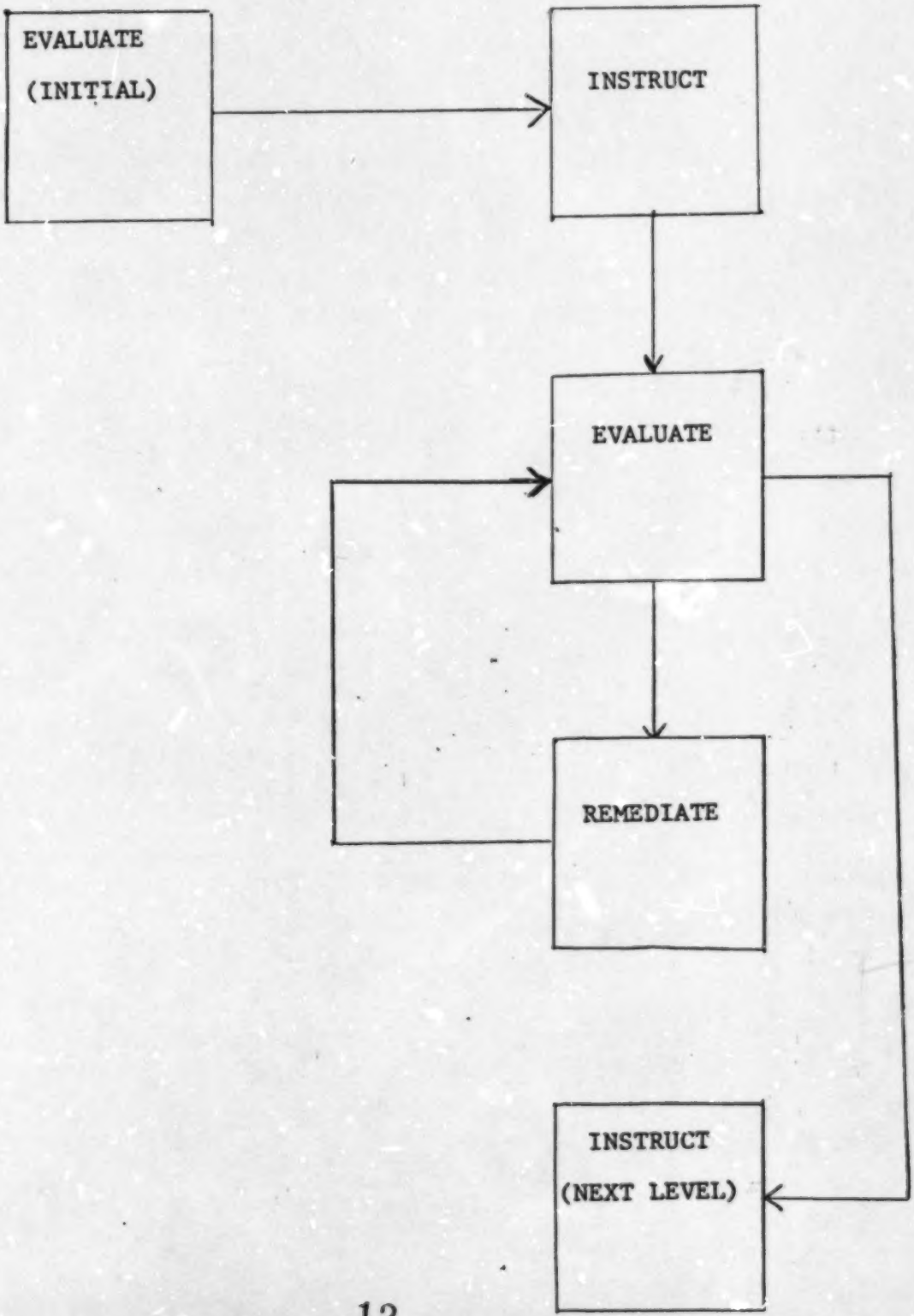
The individualization of instruction then requires the teacher to place the student in the curriculum at the appropriate level, record their progress as they work on the lesson objectives, correct their errors, require them to practice their skills, evaluate their progress to determine their mastery of the functions, instruct them on their errors in remediation sessions, re-evaluate, and, when they have exhibited mastery, advance them to the next level. In other words, as shown in Figure 1, this form of instruction (called mastery learning) uses the following steps:

1. Initial evaluation for placement.
2. Instruction on lesson (followed by practice, if appropriate).
3. Evaluation.
4. Remediation.
5. Re-evaluation - when mastery is exhibited, the student is promoted to the nest lesson.

The important feature of this process for the disadvantaged is that it guarantees success for each lesson. Research shows that when students are in a mastery learning program they will meet better than 80% of the course objectives. At the same time, research shows a 25-40% success rate for students in the traditional programs where instruction is provided to the entire group at the same time.

FIGURE 1

MASTERY TEACHING



Success in the learning of skills and knowledge required in the shop/classroom is critical for the disadvantaged. If a teacher exhibits concern about each student's progress in a formal process, the student will realize the teacher is making extra efforts and will respond. In the mass instruction process, where failure is more typical and impersonal, the teacher can expect behavioral problems.

Instructional Support Strategies

In addition to the mastery learning teaching process, several instructional support strategies have been found by educators to be successful with the disadvantaged. As with the mastery approach, these strategies require considerable planning on the part of the teacher.

Learning Centers:

One of the facts of life that a teacher must accept when working with the disadvantaged is that their reading and computational skills are not adequate. In order for these students to be successful in an occupation they must be competent in the basic academic skills. For example, students have to understand fractions to be a carpenter, or they must be able to measure liquids in cosmetology, or in automotive they must know percentages and decimals to set spark plugs or repair brakes, or in electronics they are required to compute ohms law; and all occupations require students to be able to read if they expect to be up-to-date on the latest developments in their trade.

Vocational teachers cannot expect academic teachers to motivate all students to learn English and math, but rather the vocational teacher should attempt to motivate students by emphasizing the importance of the basic skills. This promotion of the need to learn to read and to compute numbers must be included in lesson plans.

One method or approach to help these students in the basic skills is through the establishment of a math and reading center in a shop or classroom. In setting up such centers a teacher cannot expect students to voluntarily read related materials or do math problems, but rather assignments must be set up. These assignments, however, must be strictly related to the occupational program being studied by the student.

A reading center should consist of a table, several chairs, and magazines related to the occupation. The teacher then requires each student to read one or two articles a week out of a choice of five or six that are in their reading ability range. Upon completion of the article, each student should then be required to write a brief one paragraph report which will give them practice in developing their writing skills.

The math center should be organized the same way, except students are required to complete math problems related to the occupation. Upon completion of the problems, students place the answers in a tray on the learning center table to be checked. Errors should be corrected and the answers rechecked.

In order to encourage students to complete their center work, the teacher should use a reward system. One example is for students to be permitted to earn extra time to work on a project. This project may be for personal use, a hobby, for pleasure, or to be sold.

This process, of course, requires considerable teacher time. However, in most vocational programs there are also students who are above grade in reading/math. These students, who do not need as much time in a center, should be used to check student work for the teacher and for peer teaching. By allowing these students to be given such responsibilities sets a good example for all students, rewards students who may have worked harder in the earlier grades, and permits students to develop leadership abilities.

At the same time, the vocational teacher should actively seek advice and assistance from the academic teachers in setting up center programs, evaluation of materials, and in the student assessments. Academic teachers typically welcome any help or interest shown in promoting the basic skills.

Audio Visual:

Whenever possible teachers should use audio visual materials. Students learn better by using a combination of their senses. In fact, some students learn better through the use of one of their senses (for example, visual) rather than another (for example, auditory). Also, the use of aids provides a dimension to the classroom or shop that breaks monotony and exhibits extra effort on the part of the teachers.

Again a use of instructional aids takes time and planning on the part of the teacher, but they may be used for several years. In fact, older audio visual aids may be of value with respect to the presentation of a historical perspective on tools and/or processes used in the trade.

Contingency Contracts:

A contract is an agreement between a student and teacher with the ultimate goal to have the student achieve what the contract specifies. Some guidelines for setting up contracts are as follows:

1. The contract payoff should be immediate.
2. Initial contracts should call for and reward small approximations.
3. Rewards should be frequent.
4. Rewards should be for accomplishments rather than obedience (reward programs for obedience are termed behavior modification).
5. Reward accomplishments immediately after they occur.
6. A contract must be fair.
7. Contract terms must be concise.
8. The contract must be honest.
9. A contract must be positive.
10. Contracting as a method must go systematically from easy to hard.

A teacher should use different contracts and rewards for different students depending upon what is appropriate for each student. In fact, one of the goals in setting up contingency contracts is to eventually have a student plan and set up his/her own contract. Above all, a teacher should never hold a contract over the head of a student as a threat or punishment.

Other Strategies:

The above suggestions are only several of a number of strategies that can be used in a classroom to benefit the learning environment for disadvantaged students. Other suggested strategies or modifications which teachers will find useful are: utilization of field trips, community resources and guest speakers; case studies; demonstration; discovery teaching; futuristic forecasting; independent study; role playing; simulation games; student research; and values clarification. While these methods are recommended for general classroom use, these different approaches to learning can be effective in increasing student interest and in opening up new perceptions for children from disadvantaged environments.

Variables Related to Achievement

Two personal variables, which have a direct effect on student achievement and career development, are locus of control and field dependence. In the past four years I have been involved with four separate research studies on the effects of these two variables on achievement and career development.

Two of the studies, which were conducted with Dr. Ernest Cole of the New Jersey Department of Education, showed that locus of control and field dependence are related to student achievement in reading and math. The students tested were in grade 7 and 8 and were socio-economically disadvantaged. Our results were overwhelming.

In two other studies with Mr. Fran Perrino, a school principal in Old Bridge, New Jersey, the students were in high school. In one the relationship studied was between locus of control and field dependence, and overall high school achievement and career choice. Again the results were overwhelming. The other study with Mr. Perrino looked at locus of control and career maturity, and the results were, again, significant.

What is locus of control? What is field dependence? Let us look at each, how they were found to be related to achievement and career maturity, and how a teacher may work with students to influence these variables.

Locus of Control:

Locus of control is a term which indicates how much a person feels to be personally responsible for their success or failure. Locus of control scores are on a continuum (see Figure 2) where one end represents a person who is external, or has a belief they are not responsible for their fate, but rather others or luck are in control of what happens to them. The other end of the spectrum represents people who are internal, or believe that they are responsible for their successes or failures.

A person's locus is developed from their perceptions of their rewards or failures. If they perceive their rewards or failures to be due to their own efforts, they will have a feeling of internal control. If they perceive that their rewards or failures are not related to their own efforts, they will feel that control is external to their being.

Our research has found that children who do not achieve in school have a more external locus of control. We also found that children with an external locus of control have a poor self concept and are not ready to make a career choice. From past research we also know that people in the lower class (Disadvantaged) have a more external locus of control.

FIGURE 2

LOCUS OF CONTROL

EXTERNAL	INTERNAL
FAILURE OR SUCCESS NOT BECAUSE OF PERSONAL EFFORT	RESPONSIBLE FOR OWN SUCCESS OR FAILURE

FIGURE 3

FIELD DEPENDENCE

FIELD DEPENDENT	FIELD INDEPENDENT
VIEW INFORMATION AS A WHOLE AND APPLY IT DIRECTLY	ANALYTICAL SKILL VIEW INFORMATION AS THE PART OF THE WHOLE

While time does not permit me to go into more detail, I can offer my conclusions. Basically, the teacher must be sensitive to this variable and not mistake it for a behavioral or emotional problem, and must try to help the student to be more internal in their attitude.

Field Dependence:

Briefly, I will introduce the basic concept of field dependence. Field dependence, which is also on a continuum (see Figure 3), is a test that has been shown to indicate the way a person perceives and recalls information presented to them. One end, field independent, represents a person who is more analytically inclined, while the other end, field dependent, represents a person who prefers to view information as a whole and apply it directly.

Field dependent individuals have been found to be more sensitive to social cues and able to develop stronger interpersonal relations. On the other hand, field independent students seem to prefer to work independently.

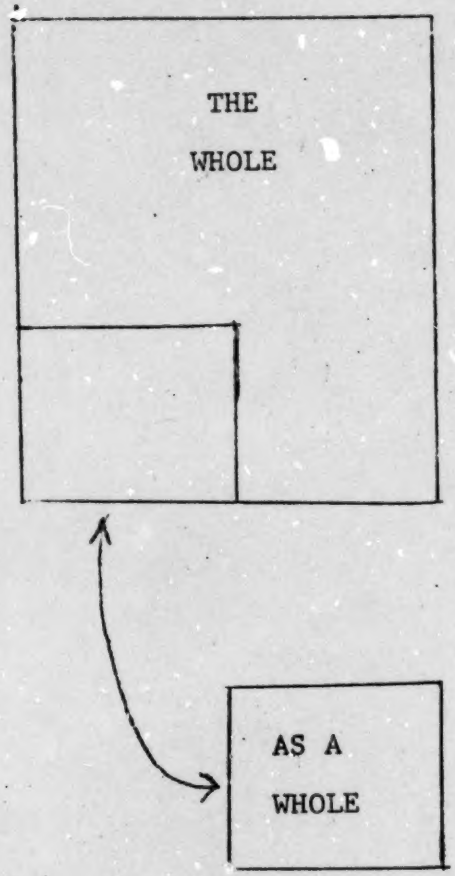
Our research found that students with higher reading and math scores were more field independent. Since this variable represents the way a person acquires information, I feel that the reason a field dependent student may not achieve may be due to the way the information is presented. For example (see Figure 4), a field independent student would prefer to see how a concept relates to the whole. A field dependent individual will look at the new concept as a whole and need the teacher to relate it to the larger whole.

Teaching Methods:

In my review of the literature related to locus of control and field dependence, I feel teachers can use some basic techniques to help students who are more external in their locus of control and/or are field dependent. These suggestions are as follows:

FIGURE 4

WORKING WITH FIELD INDEPENDENT/
FIELD DEPENDENT LEARNERS



TEACHING HOW A CONCEPT IS DIRECTLY RELATED TO THE WHOLE.

TEACHING A CONCEPT AS A WHOLE FOR APPLICATION

individualize instruction with clear directions; present tasks in steps that can be accomplished; make assessments against objectives and not personal abilities; be possitive in assessments by concentrating on ways to improve and not failures; use formal recognition (such as coaches who use stars on football helmets) along with verbal praise; do not permit "put down" jokes in the classroom; look for defensiveness to change; encourage creativity and free expression of ideas; keep anxiety down about failure; do not set the class objective as a need to cover the material on a lesson plan but be compulsive about each individual's accomplishment.

Conclusion

Teaching is often described as a skill. At one time this may have been accurate, but our knowledge of the teaching-learning process is expanding rapidly. Fortunately, a few educators recognize these developments.

As our knowledge continues to evolve, teaching is moving further away from a skill based profession to a knowledge based profession. As our society places a greater emphasis on educational achievement, teachers must become more effective. The only way to become more effective is to work from the knowledge base. I feel the process outlined in my paper today gives vocational teachers a proper knowledge base as a starting place to work with all students, but particularly with those who are disadvantaged.